IIT Hyderabad's Journey Toward a Net-Zero Emission Campus

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Sustainability at IIT Hyderabad (IITH) is evolving from an abstract ideal into an everyday campus practice. With growing concerns around climate change, energy security, and responsible resource use, academic institutions must demonstrate leadership not only through research but also through implementation. At IITH, this has taken the form of a structured commitment to become a Net-Zero Emission Campus by 2030. This journey did not begin with technology alone. It began with understanding.

Knowing Where We Stand

A comprehensive campus-wide carbon footprint assessment was undertaken using globally accepted greenhouse gas accounting principles. Emissions were mapped across electricity consumption, fuel usage, mobility, waste, and water systems. The exercise revealed that electricity demand dominates the campus emission profile - unsurprising for a modern residential academic campus operating laboratory, hostels, data infrastructure, and utilities around the clock. This quantified baseline shifted sustainability discussions from intent to action. Emissions became measurable, comparable, and manageable - allowing interventions to be prioritized based on impact rather than perception.

Clean Energy as a Foundation

Renewable energy integration emerged as a central pillar of the Net-Zero roadmap. IITH has expanded on-campus solar photovoltaic installations through rooftop and ground-mounted systems, while exploring innovative formats that integrate solar generation into daily campus spaces. Equally important is the effort to improve reliability. The campus is planning battery energy storage solutions to support solar generation, reduce dependence on diesel generators, and enhance resilience during grid disturbances.

Efficiency Before Expansion

Alongside renewable energy, IITH has emphasised demand reduction through efficiency. Large-scale replacement of conventional lighting with LEDs, adoption of high-efficiency HVAC systems, and deployment of energy-efficient motors and fans have significantly lowered baseline consumption. These measures are reinforced by digital energy monitoring systems that provide real-time visibility into consumption patterns. Treating energy as data enables continuous improvement, early fault detection, and informed operational decisions.

Looking Beyond Electricity

Sustainability efforts at IITH extend beyond power systems. Campus mobility is gradually transitioning toward electric and shared transport. Waste management practices emphasize segregation, recycling, and composting.

Water sustainability is addressed through sewage treatment, reuse of treated water for landscaping, and reduced freshwater withdrawal. Together, these measures reflect a systems approach where energy, water, and waste are managed as interconnected resources rather than isolated utilities.

A Living Laboratory

One of IITH's distinguishing strengths is the integration of sustainability into education and research. The campus itself serves as a living laboratory where students and researchers work with real operational data, develop digital twins, and test innovative solutions. Sustainability initiatives are embedded into coursework, student projects, and interdisciplinary research.

Culture and Governance

Achieving Net-Zero emissions requires more than infrastructure. It demands participation, awareness, and long-term institutional commitment. Faculty, students, staff, and service partners are active stakeholders in the transition.

Moving Forward

The journey toward Net-Zero at IIT Hyderabad is ongoing. Carbon emissions reduction trajectory (2024-2030) is shown in Figure 1. What distinguishes it is a methodical, data-driven approach that integrates operations, research, and education. At IITH, sustainability is no longer a future objective—it is becoming part of everyday campus life.
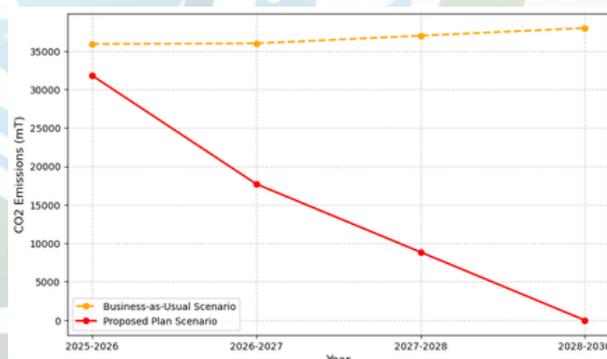

Figure 1. Carbon Emissions Reduction Trajectory (2024-2030)

Highlights

- Campus-wide carbon footprint assessment
- Baseline total GHG emissions: 37,684 tCO_2e per year (Base year: 2024
- Emissions reduction pathway: Phased mitigation across energy, efficiency, mobility, and resource systems
- Large-scale energy-efficiency retrofits
- Estimated capital investment (CAPEX): ₹77 crore for achieving Net-Zero status.

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